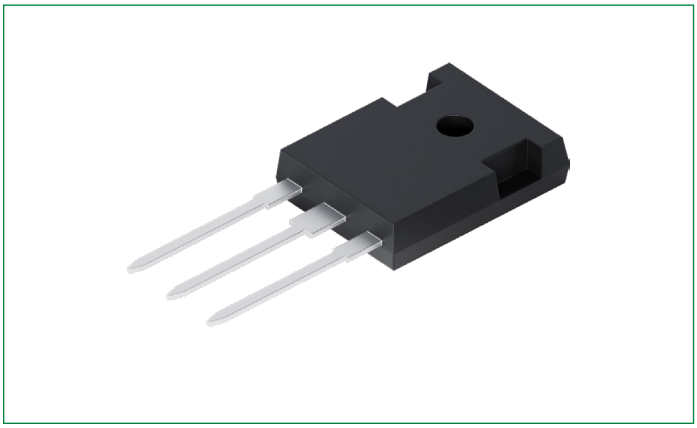
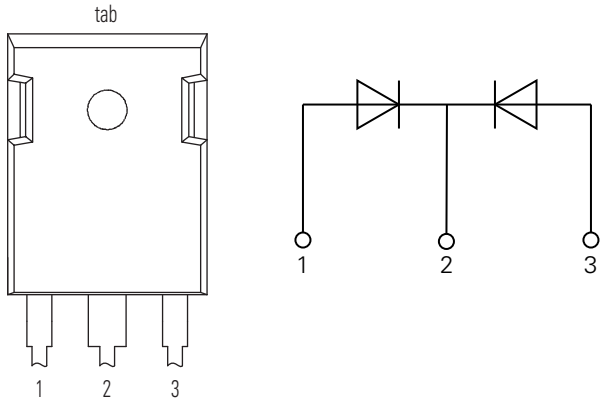
DPF100C1200HB

1200 V, 2 x 50 A High-Performance Fast Recovery Diode

RoHS



Pinout Diagram (TO-247-3L)



1: Anode; **2:** Cathode; **3:** Anode; **tab:** Cathode

Description

This 1200 V, 2 x 50 A device includes two general purpose, power switching diodes in common cathode configuration assembled in a TO-247 package.

The embedded diode chips belong to the High-Performance Fast Recovery Diode (HiPerFRED) series that features planar passivated chips, very low leakage current, and very short recovery time. These features make the HiPerFRED series suitable for high-frequency applications such as battery chargers, PFC, and high-frequency output rectifiers.

Littelfuse power-switching diodes can be integrated with other power semiconductors to provide complete power solutions for a wide range of applications.

Features

- Planar passivated chips
- Very low leakage current
- Short recovery time
- Low I_{rm} values
- Soft recovery behavior
- Soft reverse recovery

Benefits

- Low I_{rm} reduces:
  - Power dissipation within the diode
  - Turn-on loss in the commutating switch
- Improved thermal behavior
- Low EMI/RFI

Applications

- Antiparallel diode for high-frequency switching devices
- Snubber diode
- Rectifiers in Switch Mode Power Supplies (SMPS)

Product Summary

Characteristic	Value	Unit
V_{RRM}	1200	V
$I_{F(AV)}$	2 x 50	A
t_{rr}	75	ns

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Maximum Ratings (per diode)

Symbol	Characteristics	Conditions	Value	Units
V_{RRM}	Repetitive Peak Reverse Voltage	T_{vj} = 25 °C	1200	V
I_{RMS}	RMS Current	per terminal	70	A
$I_{F(AV)}$	Average Forward Current	T_C = 125 °C, T_{vj} = 175 °C; rectangular d = 0.5	50	A
I_{FSM}	Non-repetitive Surge Forward Current	t = 10 ms; (50 Hz), sine; V_R = 0 V, T_{vj} = 45 °C	400	A
T_{stg}	Storage Temperature Range	–	–55 to +150	°C
T_{vj}	Virtual Junction Temperature Range	–	–55 to +175	°C
T_{op}	Operating Temperature Range	–	–55 to +150	°C
P_{tot}	Total Power Dissipation	T_C = 25 °C	214	W

Thermal Specifications

Symbol	Characteristic	Value			Unit
		Min.	Typ.	Max.	
$R_{th(j-c)}$	Maximum Thermal Resistance, Junction to Case	–	–	0.7	K/W
$R_{th(c-h)}$	Typical Thermal Resistance, Case to Heatsink	–	0.25	–	K/W

Electrical Characteristics – Static

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
I_R	Reverse Current	T_{vj} = 25 °C	$V_R = V_{RRM}$	–	–	20	µA
		T_{vj}= 125 °C		–	150	2000	
V_F	Forward Voltage	T_{vj} = 25 °C	I_F = 50 A	–	2	2.5	V
			I_F = 100 A	–	2.4	–	
		T_{vj} = 150 °C	I_F = 50 A	–	1.6	1.9	
			I_F = 100 A	–	2.15	–	
$V_{(FO)}$	Threshold Voltage	T_{vj}= 175 °C		–	–	0.96	V
r_F	Slope Resistance	T_{vj} = 175 °C		–	–	12.4	mΩ
C_j	Junction Capacitance	V_R = 200 V		–	53	–	pF

Electrical Characteristics – Dynamic

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
Q_{rr}	Reverse Recovery Charge	T_{vj} = 25 °C	I_F = 50 A; V_R = 600 V di/dt = 1000 A/µs	–	3	–	µC
		T_{vj} = 125 °C		–	9	–	
I_{rm}	Reverse Recovery Current	T_{vj} = 25 °C		–	42	–	A
		T_{vj} = 125 °C		–	60	–	
t_{rr}	Reverse Recovery Time	T_{vj} = 25 °C		–	75	–	ns
		T_{vj} = 125 °C		–	135	–	

Characteristic Curves

Figure 1. Forward Characteristics

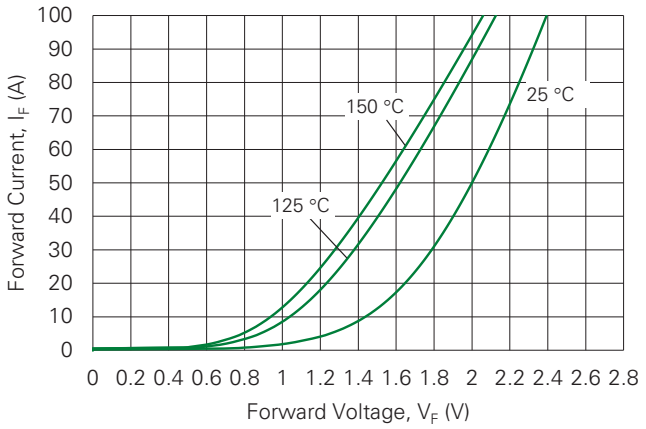


Figure 2. Junction Capacitance vs. Reverse Voltage

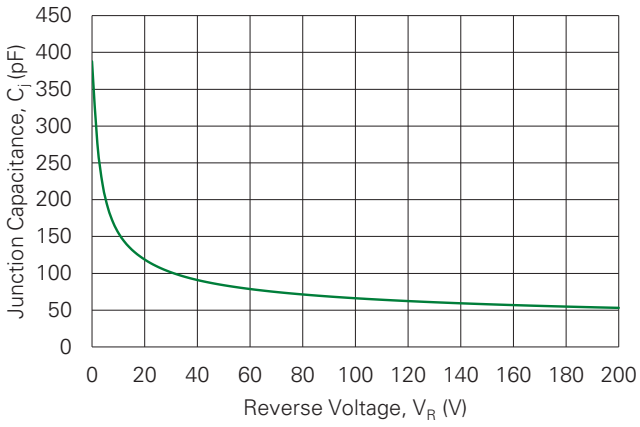


Figure 3. Power Dissipation vs. Temperature

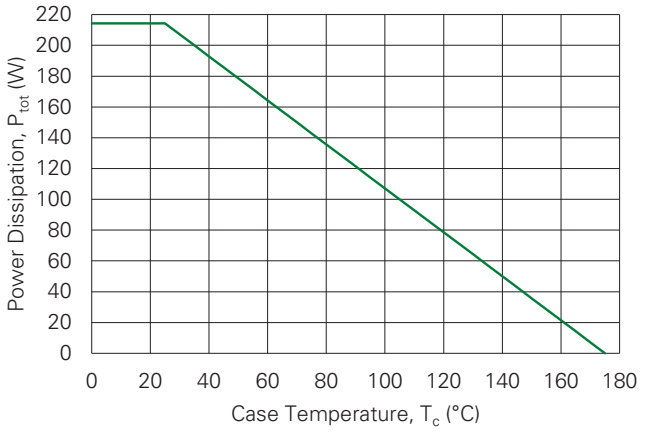


Figure 4. Current Derating Curve

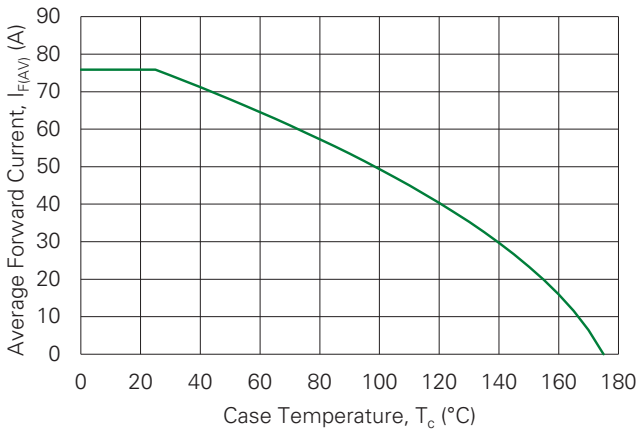
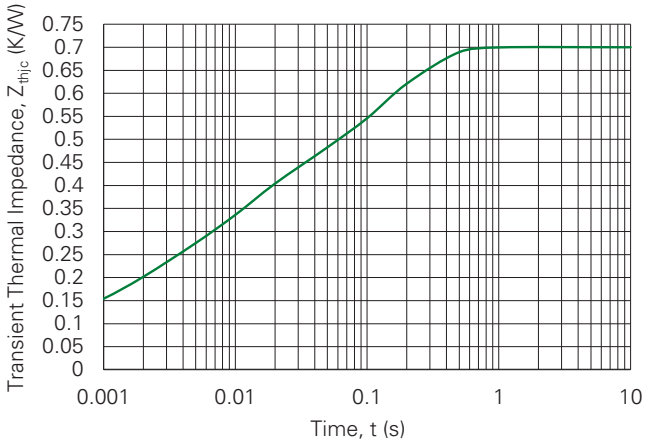
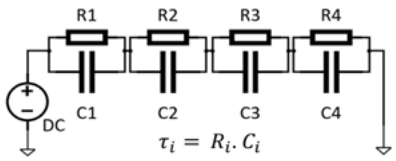


Figure 5. Transient Thermal Impedance





$$\tau_i = R_i . C_i$$

$$Zth(t) = \sum_i R_i \left[1 - e^{\left(-\frac{t}{\tau_i}\right)}\right]$$

i	1	2	3	4
R_i	0.078	0.116	0.206	0.3
τ_i	0.00016	0.0015	0.011	0.15

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Figure 6. Reverse Recovery Charge vs. di/dt

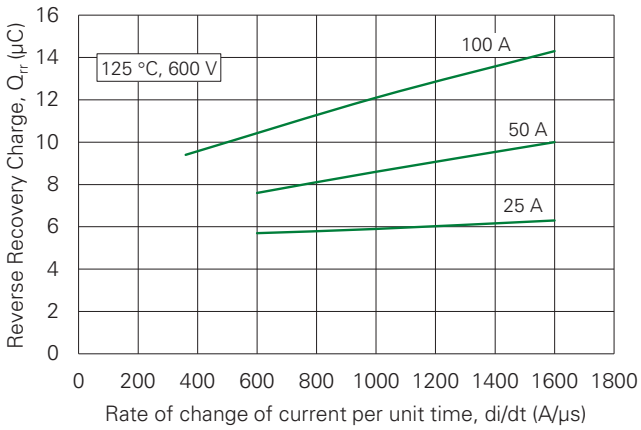


Figure 7. Reverse Recovery Current vs. di/dt

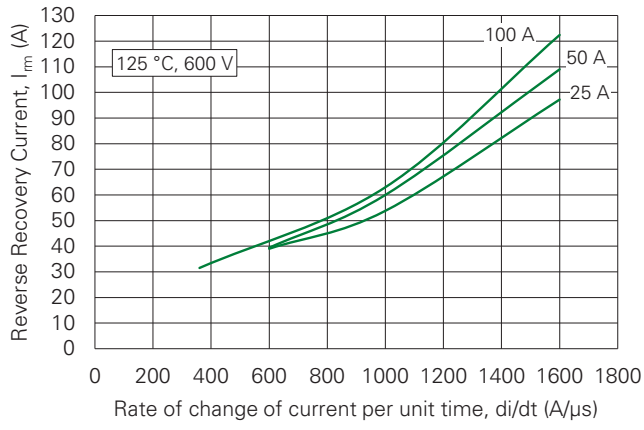


Figure 8. Reverse Recovery Time vs. di/dt

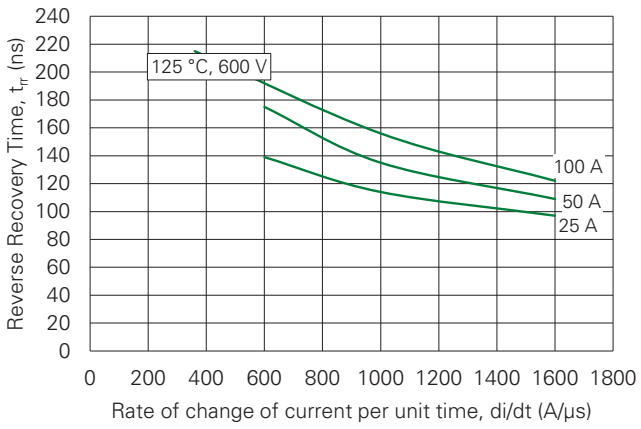
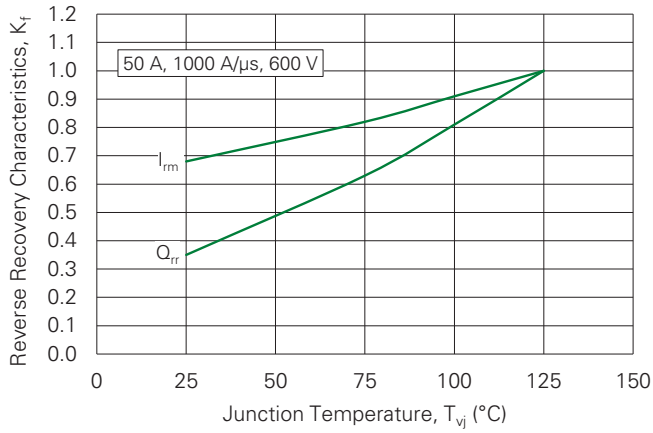
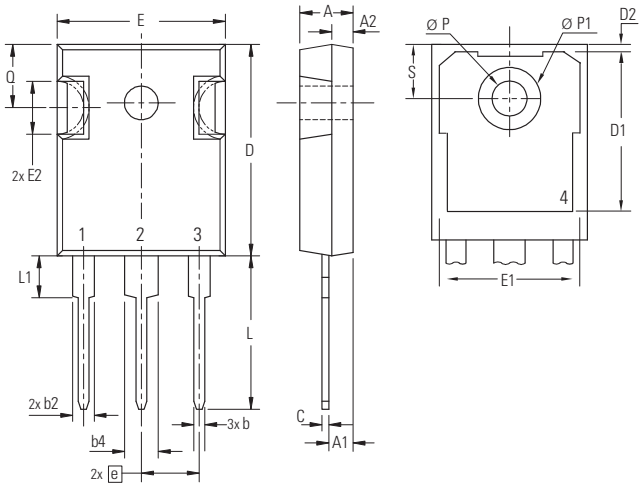


Figure 9. Recovery Characteristics vs. Temperature

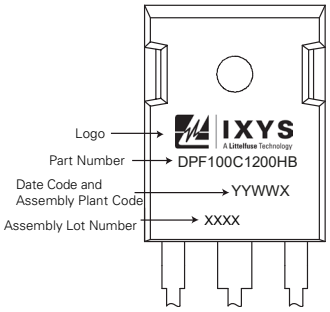


Part Outline Drawing (TO-247-3L)



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max
A	4.70	5.30	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
b4	2.59	3.43	0.102	0.135
C	0.38	0.89	0.015	0.035
D	20.79	21.45	0.819	0.845
D1	13.07	–	0.515	–
D2	0.51	1.35	0.020	0.053
e	5.46 BSC		0.215 BSC	
E	15.48	16.24	0.610	0.640
E1	13.45	–	0.530	–
E2	4.31	5.48	0.170	0.216
L	19.80	20.30	0.780	0.800
L1	–	4.49	–	0.177
Q	5.38	6.19	0.212	0.244
S	6.14 BSC		0.242 BSC	
ØP	3.55	3.65	0.140	0.144
ØP1	–	7.39	–	0.29

Part Numbering and Marking

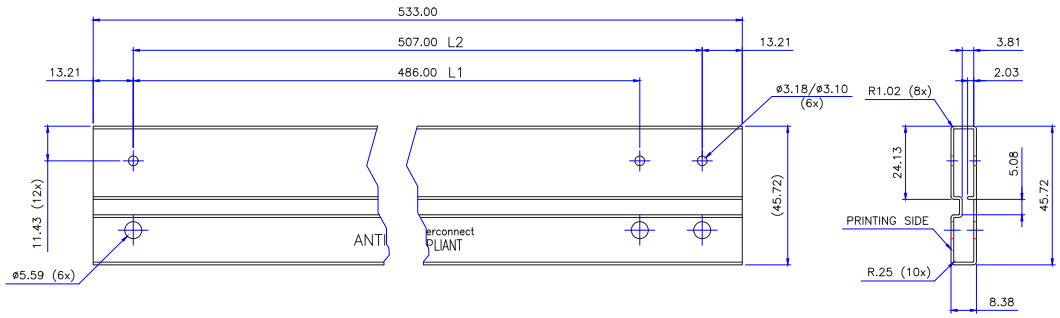


D	=	Diode
P	=	HiPerFRED
F	=	Ultra Fast
100	=	Current Rating (A)
C	=	Common Cathode
1200	=	Reverse Voltage (V)
HB	=	Package (TO-247-3L)

Packing Options

Part Number	Marking	Packing Mode	M.O.Q.
DPF100C1200HB	DPF100C1200HB	Tube (30 pcs)	300

Packing Specifications (Tube Option)



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